

SEQUENCE LISTING

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 MASUHO, YASUHIKO

<120> FATTY ACID TRANSPORTER PROTEINS AND THE GENES ENCODING
 THE PROTEINS

<130> 084335-0154

<140> 10/030,226

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<151> 2000-07-07

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<151> 1999-07-08

<150> 60/159,586

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<160> 15

<170> PatentIn Ver. 2.1

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Met Gly Val Cys Gln Arg Thr Arg Ala Pro Trp Lys Glu Lys Ser Gln
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cta gaa cga gcg gcc cta ggt ttt cgg aag gga gga tca ggg atg ttt      154
Leu Glu Arg Ala Ala Leu Gly Phe Arg Lys Gly Gly Ser Gly Met Phe
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Ala Ser Gly Trp Asn Gln Thr Val Pro Ile Glu Glu Ala Gly Ser Met
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Leu Lys Leu His Leu Trp Pro Gln Leu Arg Trp Leu Pro Ala Asp Leu	
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Ala Leu Ala Ala Ala Ala Ala Asp Pro Glu Gly Pro Glu Gly Gly Cys	
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Ser Leu Ala Trp Arg Leu Ala Glu Leu Ala Gln Gln Arg Ala Ala His	
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Thr Phe Leu Ile His Gly Ser Arg Arg Phe Ser Tyr Ser Glu Ala Glu	
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cgc gag agt aac agg gct gca cgc gcc ttc cta cgt gcg cta ggc tgg	538
Arg Glu Ser Asn Arg Ala Ala Arg Ala Phe Leu Arg Ala Leu Gly Trp	
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Asp Trp Gly Pro Asp Gly Gly Asp Ser Gly Glu Gly Ser Ala Gly Glu	
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Gly Glu Arg Ala Ala Pro Gly Ala Gly Asp Ala Ala Ala Gly Ser Gly	
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Ala Glu Phe Ala Gly Gly Asp Gly Ala Ala Arg Gly Gly Gly Ala Ala	
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Pro Glu Phe Leu Trp Leu Trp Phe Gly Leu Ala Lys Ala Gly Leu Arg	
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Thr Ala Phe Val Pro Thr Ala Leu Arg Arg Gly Pro Leu Leu His Cys	
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Leu Arg Ser Cys Gly Ala Arg Ala Leu Val Leu Ala Pro Glu Phe Leu	
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Glu Ser Leu Glu Pro Asp Leu Pro Ala Leu Arg Ala Met Gly Leu His	
275 280 285	
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Leu Trp Ala Ala Gly Pro Gly Thr His Pro Ala Gly Ile Ser Asp Leu	
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Leu Ala Glu Val Ser Ala Glu Val Asp Gly Pro Val Pro Gly Tyr Leu	
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Ser Ser Pro Gln Ser Ile Thr Asp Thr Cys Leu Tyr Ile Phe Thr Ser	
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Gly Thr Thr Gly Leu Pro Lys Ala Ala Arg Ile Ser His Leu Lys Ile	
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Leu Gln Cys Gln Gly Phe Tyr Gln Leu Cys Gly Val His Gln Glu Asp	
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Val Ile Tyr Leu Ala Leu Pro Leu Tyr His Met Ser Gly Ser Leu Leu	
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Gly Ile Val Gly Cys Met Gly Ile Gly Ala Thr Val Val Leu Lys Ser	
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Lys Phe Ser Ala Gly Gln Phe Trp Glu Asp Cys Gln Gln His Arg Val	
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Thr Val Phe Gln Tyr Ile Gly Glu Leu Cys Arg Tyr Leu Val Asn Gln	
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ccc ccg agc aag gca gaa cgt ggc cat aag gtc cgg ctg gca gtg ggc	1402
Pro Pro Ser Lys Ala Glu Arg Gly His Lys Val Arg Leu Ala Val Gly	
435 440 445	
agc ggg ctg cgc cca gat acc tgg gag cgt ttt gtg cgg cgc ttc ggg	1450
Ser Gly Leu Arg Pro Asp Thr Trp Glu Arg Phe Val Arg Arg Phe Gly	
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Pro Leu Gln Val Leu Glu Thr Tyr Gly Leu Thr Glu Gly Asn Val Ala	
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acc atc aac tac aca gga cag cgg ggc gct gtg ggg cgt gct tcc tgg	1546
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Leu Tyr Lys His Ile Phe Pro Phe Ser Leu Ile Arg Tyr Asp Val Thr	
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Thr Gly Glu Pro Ile Arg Asp Pro Gln Gly His Cys Met Ala Thr Ser	
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Pro Gly Glu Pro Gly Leu Leu Val Ala Pro Val Ser Gln Gln Ser Pro	
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ttc ctg ggc tat gct ggc ggg cca gag ctg gcc cag ggg aag ttg cta	1738
Phe Leu Gly Tyr Ala Gly Gly Pro Glu Leu Ala Gln Gly Lys Leu Leu	
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Lys Asp Val Phe Arg Pro Gly Asp Val Phe Phe Asn Thr Gly Asp Leu	
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Asp Thr Phe Arg Trp Lys Gly Glu Asn Val Ala Thr Thr Glu Val Ala	
595 600 605	
gag gtc ttc gag gcc cta gat ttt ctt cag gag gtg aac gtc tat gga	1930
Glu Val Phe Glu Ala Leu Asp Phe Leu Gln Glu Val Asn Val Tyr Gly	
610 615 620	
gtc act gtg cca ggg cat gaa ggc agg gct gga atg gca gcc cta gtt	1978
Val Thr Val Pro Gly His Glu Gly Arg Ala Gly Met Ala Ala Leu Val	
625 630 635 640	
ctg cgt ccc ccc cac gct ttg gac ctt atg cag ctc tac acc cac gtg	2026
Leu Arg Pro Pro His Ala Leu Asp Leu Met Gln Leu Tyr Thr His Val	
645 650 655	
tct gag aac ttg cca cct tat gcc cgg ccc cga ttc ctc agg ctc cag	2074
Ser Glu Asn Leu Pro Pro Tyr Ala Arg Pro Arg Phe Leu Arg Leu Gln	
660 665 670	
gag tct ttg gcc acc aca gag acc ttc aaa cag cag aaa gtt cgg atg	2122
Glu Ser Leu Ala Thr Thr Glu Thr Phe Lys Gln Gln Lys Val Arg Met	
675 680 685	
gca aat gag ggc ttc gac ccc agc acc ctg tct gac cca ctg tac gtt	2170
Ala Asn Glu Gly Phe Asp Pro Ser Thr Leu Ser Asp Pro Leu Tyr Val	
690 695 700	
ctg gac cag gct gta ggt gcc tac ctg ccc ctc aca act gcc cgg tac	2218
Leu Asp Gln Ala Val Gly Ala Tyr Leu Pro Leu Thr Thr Ala Arg Tyr	
705 710 715 720	

agc gcc ctc ctg gca gga aac ctt cga atc tgagaacttc cacacctgag 2268
 Ser Ala Leu Leu Ala Gly Asn Leu Arg Ile
 725 730

gcacctgaga gaggaactct gtgggggtggg ggccgttgca ggtgtactgg gctgtcaggg 2328

atcttttcta taccagaact gcggtcacta ttttgtaata aatgtggctg gagctgatcc 2388

agctgtctct gacctac 2405

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<211> 730

<212> PRT

<213> Homo sapiens

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Ala Ser Gly Trp Asn Gln Thr Val Pro Ile Glu Glu Ala Gly Ser Met
 35 40 45

Ala Ala Leu Leu Leu Leu Pro Leu Leu Leu Leu Pro Leu Leu Leu
 50 55 60

Leu Lys Leu His Leu Trp Pro Gln Leu Arg Trp Leu Pro Ala Asp Leu
 65 70 75 80

Ala Phe Ala Val Arg Ala Leu Cys Cys Lys Arg Ala Leu Arg Ala Arg
 85 90 95

Ala Leu Ala Ala Ala Ala Ala Asp Pro Glu Gly Pro Glu Gly Gly Cys
 100 105 110

Ser Leu Ala Trp Arg Leu Ala Glu Leu Ala Gln Gln Arg Ala Ala His
 115 120 125

Thr Phe Leu Ile His Gly Ser Arg Arg Phe Ser Tyr Ser Glu Ala Glu
 130 135 140

Arg Glu Ser Asn Arg Ala Ala Arg Ala Phe Leu Arg Ala Leu Gly Trp
 145 150 155 160

Asp Trp Gly Pro Asp Gly Gly Asp Ser Gly Glu Gly Ser Ala Gly Glu
 165 170 175

Gly Glu Arg Ala Ala Pro Gly Ala Gly Asp Ala Ala Ala Gly Ser Gly
 180 185 190

Ala Glu Phe Ala Gly Gly Asp Gly Ala Ala Arg Gly Gly Gly Ala Ala
 195 200 205

Ala Pro Leu Ser Pro Gly Ala Thr Val Ala Leu Leu Leu Pro Ala Gly
 210 215 220

Pro	Glu	Phe	Leu	Trp	Leu	Trp	Phe	Gly	Leu	Ala	Lys	Ala	Gly	Leu	Arg	225	230	235	240
Thr	Ala	Phe	Val	Pro	Thr	Ala	Leu	Arg	Arg	Gly	Pro	Leu	Leu	His	Cys	245	250	255	
Leu	Arg	Ser	Cys	Gly	Ala	Arg	Ala	Leu	Val	Leu	Ala	Pro	Glu	Phe	Leu	260	265	270	
Glu	Ser	Leu	Glu	Pro	Asp	Leu	Pro	Ala	Leu	Arg	Ala	Met	Gly	Leu	His	275	280	285	
Leu	Trp	Ala	Ala	Gly	Pro	Gly	Thr	His	Pro	Ala	Gly	Ile	Ser	Asp	Leu	290	295	300	
Leu	Ala	Glu	Val	Ser	Ala	Glu	Val	Asp	Gly	Pro	Val	Pro	Gly	Tyr	Leu	305	310	315	320
Ser	Ser	Pro	Gln	Ser	Ile	Thr	Asp	Thr	Cys	Leu	Tyr	Ile	Phe	Thr	Ser	325	330	335	
Gly	Thr	Thr	Gly	Leu	Pro	Lys	Ala	Ala	Arg	Ile	Ser	His	Leu	Lys	Ile	340	345	350	
Leu	Gln	Cys	Gln	Gly	Phe	Tyr	Gln	Leu	Cys	Gly	Val	His	Gln	Glu	Asp	355	360	365	
Val	Ile	Tyr	Leu	Ala	Leu	Pro	Leu	Tyr	His	Met	Ser	Gly	Ser	Leu	Leu	370	375	380	
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Lys	Phe	Ser	Ala	Gly	Gln	Phe	Trp	Glu	Asp	Cys	Gln	Gln	His	Arg	Val	405	410	415	
Thr	Val	Phe	Gln	Tyr	Ile	Gly	Glu	Leu	Cys	Arg	Tyr	Leu	Val	Asn	Gln	420	425	430	
Pro	Pro	Ser	Lys	Ala	Glu	Arg	Gly	His	Lys	Val	Arg	Leu	Ala	Val	Gly	435	440	445	
Ser	Gly	Leu	Arg	Pro	Asp	Thr	Trp	Glu	Arg	Phe	Val	Arg	Arg	Phe	Gly	450	455	460	
Pro	Leu	Gln	Val	Leu	Glu	Thr	Tyr	Gly	Leu	Thr	Glu	Gly	Asn	Val	Ala	465	470	475	480
Thr	Ile	Asn	Tyr	Thr	Gly	Gln	Arg	Gly	Ala	Val	Gly	Arg	Ala	Ser	Trp	485	490	495	
Leu	Tyr	Lys	His	Ile	Phe	Pro	Phe	Ser	Leu	Ile	Arg	Tyr	Asp	Val	Thr	500	505	510	
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Pro Gly Glu Pro Gly Leu Leu Val Ala Pro Val Ser Gln Gln Ser Pro
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 Phe Leu Gly Tyr Ala Gly Gly Pro Glu Leu Ala Gln Gly Lys Leu Leu
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 Lys Asp Val Phe Arg Pro Gly Asp Val Phe Phe Asn Thr Gly Asp Leu
 565 570 575
 Leu Val Cys Asp Asp Gln Gly Phe Leu Arg Phe His Asp Arg Thr Gly
 580 585 590
 Asp Thr Phe Arg Trp Lys Gly Glu Asn Val Ala Thr Thr Glu Val Ala
 595 600 605
 Glu Val Phe Glu Ala Leu Asp Phe Leu Gln Glu Val Asn Val Tyr Gly
 610 615 620
 Val Thr Val Pro Gly His Glu Gly Arg Ala Gly Met Ala Ala Leu Val
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 Ser Glu Asn Leu Pro Pro Tyr Ala Arg Pro Arg Phe Leu Arg Leu Gln
 660 665 670
 Glu Ser Leu Ala Thr Thr Glu Thr Phe Lys Gln Gln Lys Val Arg Met
 675 680 685
 Ala Asn Glu Gly Phe Asp Pro Ser Thr Leu Ser Asp Pro Leu Tyr Val
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<211> 30

<212> DNA

<213> Artificial Sequence

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<223> Description of Combined DNA/RNA Molecule: Artificially synthesized oligo-cap linker

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<223> Description of Artificial Sequence: Artificially synthesized oligo-cap linker

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<210> 4
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 <212> DNA
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 <223> Description of Artificial Sequence: Artificially
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<210> 6
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<210> 7
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<210> 8
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 <212> DNA
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 <400> 9
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 <212> DNA
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 <400> 10
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 <210> 12
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<210> 13
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<210> 14
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 35 40 45
 Arg Ile Ala Arg Ala Phe Leu Arg Ala Arg Gly Trp Thr Gly Gly Arg
 50 55 60

Arg	Gly	Ser	Gly	Arg	Gly	Ser	Thr	Glu	Glu	Gly	Ala	Arg	Val	Ala	Pro	65	70	75	80
Pro	Ala	Gly	Asp	Ala	Ala	Ala	Arg	Gly	Thr	Thr	Ala	Pro	Pro	Leu	Ala	85	90	95	
Pro	Gly	Ala	Thr	Val	Ala	Leu	Leu	Leu	Pro	Ala	Gly	Pro	Asp	Phe	Leu	100	105	110	
Trp	Ile	Trp	Phe	Gly	Leu	Ala	Lys	Ala	Gly	Leu	Arg	Thr	Ala	Phe	Val	115	120	125	
Pro	Thr	Ala	Leu	Arg	Arg	Gly	Pro	Leu	Leu	His	Cys	Leu	Arg	Ser	Cys	130	135	140	
Gly	Ala	Ser	Ala	Leu	Val	Leu	Ala	Thr	Glu	Phe	Leu	Glu	Ser	Leu	Glu	145	150	155	160
Pro	Asp	Leu	Pro	Ala	Leu	Arg	Ala	Met	Gly	Leu	His	Leu	Trp	Ala	Thr	165	170	175	
Gly	Pro	Glu	Thr	Asn	Val	Ala	Gly	Ile	Ser	Asn	Leu	Leu	Ser	Glu	Ala	180	185	190	
Ala	Asp	Gln	Val	Asp	Glu	Pro	Val	Pro	Gly	Tyr	Leu	Ser	Ala	Pro	Gln	195	200	205	
Asn	Ile	Met	Asp	Thr	Cys	Leu	Tyr	Ile	Phe	Thr	Ser	Gly	Thr	Thr	Gly	210	215	220	
Leu	Pro	Lys	Ala	Ala	Arg	Ile	Ser	His	Leu	Lys	Val	Leu	Gln	Cys	Gln	225	230	235	240
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Ala	Leu	Pro	Leu	Tyr	His	Met	Ser	Gly	Ser	Leu	Leu	Gly	Ile	Val	Gly	260	265	270	
Cys	Leu	Gly	Ile	Gly	Ala	Thr	Val	Val	Leu	Lys	Pro	Lys	Phe	Ser	Ala	275	280	285	
Ser	Gln	Phe	Trp	Asp	Asp	Cys	Gln	Lys	His	Arg	Val	Thr	Val	Phe	Gln	290	295	300	
Tyr	Ile	Gly	Glu	Leu	Cys	Arg	Tyr	Leu	Val	Asn	Gln	Pro	Pro	Ser	Lys	305	310	315	320
Ala	Glu	Phe	Asp	His	Lys	Val	Arg	Leu	Ala	Val	Gly	Ser	Gly	Leu	Arg	325	330	335	
Pro	Asp	Thr	Trp	Glu	Arg	Phe	Leu	Arg	Arg	Phe	Gly	Pro	Leu	Gln	Ile	340	345	350	
Leu	Glu	Thr	Tyr	Gly	Met	Thr	Glu	Gly	Asn	Val	Ala	Thr	Phe	Asn	Tyr	355	360	365	

Thr Gly Arg Gln Gly Ala Val Gly Arg Ala Ser Trp Leu Tyr Lys His
 370 375 380
 Ile Phe Pro Phe Ser Leu Ile Arg Tyr Asp Val Met Thr Gly Glu Pro
 385 390 395 400
 Ile Arg Asn Ala Gln Gly His Cys Met Thr Thr Ser Pro Gly Glu Pro
 405 410 415
 Gly Leu Leu Val Ala Pro Val Ser Gln Gln Ser Pro Phe Leu Gly Tyr
 420 425 430
 Ala Gly Ala Pro Glu Leu Ala Lys Asp Lys Leu Leu Lys Asp Val Phe
 435 440 445
 Trp Ser Gly Asp Val Phe Phe Asn Thr Gly Asp Leu Leu Val Cys Asp
 450 455 460
 Glu Gln Gly Phe Leu His Phe His Asp Arg Thr Gly Asp Thr Ile Arg
 465 470 475 480
 Trp Lys Gly Glu Asn Val Ala Thr Thr Glu Val Ala Glu Val Leu Glu
 485 490 495
 Thr Leu Asp Phe Leu Gln Glu Val Asn Ile Tyr Gly Val Thr Val Pro
 500 505 510
 Gly His Glu Gly Arg Ala Gly Met Ala Ala Leu Ala Leu Arg Pro Pro
 515 520 525
 Gln Ala Leu Asn Leu Val Gln Leu Tyr Ser His Val Ser Glu Asn Leu
 530 535 540
 Pro Pro Tyr Ala Arg Pro Arg Phe Leu Arg Leu Gln Glu Ser Leu Ala
 545 550 555 560
 Thr Thr Glu Thr Phe Lys Gln Gln Lys Val Arg Met Ala Asn Glu Gly
 565 570 575
 Phe Asp Pro Ser Val Leu Ser Asp Pro Leu Tyr Val Leu Asp Gln Asp
 580 585 590
 Ile Gly Ala Tyr Leu Pro Leu Thr Pro Ala Arg Tyr Ser Ala Leu Leu
 595 600 605
 Ser Gly Asp Leu Arg Ile
 610

<210> 15

<211> 620

<212> PRT

<213> Homo sapiens

<400> 15

Met Leu Ser Ala Ile Tyr Thr Val Leu Ala Gly Leu Leu Phe Leu Pro
 1 5 10 15

Leu Leu Val Asn Leu Cys Cys Pro Tyr Phe Phe Gln Asp Ile Gly Tyr
 20 25 30
 Phe Leu Lys Val Ala Ala Val Gly Arg Arg Val Arg Ser Tyr Gly Gln
 35 40 45
 Arg Arg Pro Ala Arg Thr Ile Leu Arg Ala Phe Leu Glu Lys Ala Arg
 50 55 60
 Gln Thr Pro His Lys Pro Phe Leu Leu Phe Arg Asp Glu Thr Leu Thr
 65 70 75 80
 Tyr Ala Gln Val Asp Arg Arg Ser Asn Gln Val Ala Arg Ala Leu His
 85 90 95
 Asp His Leu Gly Leu Arg Gln Gly Asp Cys Val Ala Leu Leu Met Gly
 100 105 110
 Asn Glu Pro Ala Tyr Val Trp Leu Trp Leu Gly Leu Val Lys Leu Gly
 115 120 125
 Cys Ala Met Ala Cys Leu Asn Tyr Asn Ile Arg Ala Lys Ser Leu Leu
 130 135 140
 His Cys Phe Gln Cys Cys Gly Ala Lys Val Leu Leu Val Ser Pro Glu
 145 150 155 160
 Leu Gln Ala Ala Val Glu Glu Ile Leu Pro Ser Leu Lys Lys Asp Asp
 165 170 175
 Val Ser Ile Tyr Tyr Val Ser Arg Thr Ser Asn Thr Asp Gly Ile Asp
 180 185 190
 Ser Phe Leu Asp Lys Val Asp Glu Val Ser Thr Glu Pro Ile Pro Glu
 195 200 205
 Ser Trp Arg Ser Glu Val Thr Phe Ser Thr Pro Ala Leu Tyr Ile Tyr
 210 215 220
 Thr Ser Gly Thr Thr Gly Leu Pro Lys Ala Ala Met Ile Thr His Gln
 225 230 235 240
 Arg Ile Trp Tyr Gly Thr Gly Leu Thr Phe Val Ser Gly Leu Lys Ala
 245 250 255
 Asp Asp Val Ile Tyr Ile Thr Leu Pro Phe Tyr His Ser Ala Ala Leu
 260 265 270
 Leu Ile Gly Ile His Gly Cys Ile Val Ala Gly Ala Thr Leu Ala Leu
 275 280 285
 Arg Thr Lys Phe Ser Ala Ser Gln Phe Trp Asp Asp Cys Arg Lys Tyr
 290 295 300
 Asn Val Thr Val Ile Gln Tyr Ile Gly Glu Leu Leu Arg Tyr Leu Cys
 305 310 315 320

Asn	Ser	Pro	Gln	Lys	Pro	Asn	Asp	Arg	Asp	His	Lys	Val	Arg	Leu	Ala	325	330	335	
Leu	Gly	Asn	Gly	Leu	Arg	Gly	Asp	Val	Trp	Arg	Gln	Phe	Val	Lys	Arg	340	345	350	
Phe	Gly	Asp	Ile	Cys	Ile	Tyr	Glu	Phe	Tyr	Ala	Ala	Thr	Glu	Gly	Asn	355	360	365	
Ile	Gly	Phe	Met	Asn	Tyr	Ala	Arg	Lys	Val	Gly	Ala	Val	Gly	Arg	Val	370	375	380	
Asn	Tyr	Leu	Gln	Lys	Lys	Ile	Ile	Thr	Tyr	Asp	Leu	Ile	Lys	Tyr	Asp	385	390	395	400
Val	Glu	Lys	Asp	Glu	Pro	Val	Arg	Asp	Glu	Asn	Gly	Tyr	Cys	Val	Arg	405	410	415	
Val	Pro	Lys	Gly	Glu	Val	Gly	Leu	Leu	Val	Cys	Lys	Ile	Thr	Gln	Leu	420	425	430	
Thr	Pro	Phe	Asn	Gly	Tyr	Ala	Gly	Ala	Lys	Ala	Gln	Thr	Glu	Lys	Lys	435	440	445	
Lys	Leu	Arg	Asp	Val	Phe	Lys	Lys	Gly	Asp	Leu	Tyr	Phe	Asn	Ser	Gly	450	455	460	
Asp	Leu	Leu	Met	Val	Asp	His	Glu	Asn	Phe	Ile	Tyr	Phe	His	Asp	Arg	465	470	475	480
Val	Gly	Asp	Thr	Phe	Arg	Trp	Lys	Gly	Glu	Asn	Val	Ala	Thr	Thr	Glu	485	490	495	
Val	Ala	Asp	Thr	Val	Gly	Leu	Val	Asp	Phe	Val	Gln	Glu	Val	Asn	Val	500	505	510	
Tyr	Gly	Val	His	Val	Pro	Asp	His	Glu	Gly	Arg	Ile	Gly	Met	Ala	Ser	515	520	525	
Ile	Lys	Met	Lys	Glu	Asn	His	Glu	Phe	Asp	Gly	Lys	Lys	Leu	Phe	Gln	530	535	540	
His	Ile	Ala	Asp	Tyr	Leu	Pro	Ser	Tyr	Ala	Arg	Pro	Arg	Phe	Leu	Arg	545	550	555	560
Ile	Gln	Asp	Thr	Ile	Glu	Ile	Thr	Gly	Thr	Phe	Lys	His	Arg	Lys	Met	565	570	575	
Thr	Leu	Val	Glu	Glu	Gly	Phe	Asn	Pro	Ala	Val	Ile	Lys	Asp	Ala	Leu	580	585	590	
Tyr	Phe	Leu	Asp	Asp	Thr	Ala	Lys	Met	Tyr	Val	Pro	Met	Thr	Glu	Asp	595	600	605	
Ile	Tyr	Asn	Ala	Ile	Ser	Ala	Lys	Thr	Leu	Lys	Leu					610	615	620	